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IDEA-2449/71
Copy ___ of ___

28 October 1971

MEMORANDUM FOR THE RECORD

SUBJECT: Survival Kit Deployment

1. The survival kit presently used with the U-2R aircraft has a nonautomatic deployment system. The kit is attached to accessory rings located on the right and left sides of the pilot's harness. During parachute descent the kit is manually deployed by pulling a handle assembly located on the top forward right side of the kit. The kit is retained 25 feet below the pilot on a lanyard attached to the right side of the harness. If a raft is carried in the kit, it is attached to the lanyard 10 feet above the kit and is actuated automatically with kit deployment.

2. During survival training (parachute phase) the pilot is instructed to deploy his kit approximately 1500-2000 feet above the terrain. The reason for not deploying the kit at a lower altitude is, if the kit fails to release properly; e.g., hang up on one side, the pilot will have time to get the kit free before landing. The reason for not deploying the kit at a higher altitude is due to oscillation that can be caused by the kit hanging below the pilot. The weight of the kit is approximately 55 pounds and hanging 25 feet below the pilot, acts like a pendulum and can cause severe oscillation. Records show that oscillation caused by the pendulum action of the kit can become so severe that the kit will rotate on a horizontal plane around the jumper. This can result in disorientation, motion sickness, and can put the jumper into a bad attitude for landing resulting in injury.

3. The need for an automatically deployed kit in our program does exist for the following reasons:

- a. If the pilot is injured during ejection; e.g., with a fractured right arm, he may not be able to deploy the kit.

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- b. He may be in shock and not remember to deploy the kit.
- c. He may be semiconscious or unconscious.
- d. Landing with the kit attached can cause injury by landing on the kit, poor landing attitude caused by the kit and the additional weight.
- e. With the kit deployed, the pilot's rate of descent will slow after the kit hits the ground. This is so noticeable that among experienced jumpers, it is often referred to as "putting on the brakes" after the kit makes contact with the ground.
- f. Landing in water with the kit not deployed, especially in a very rough and shark-infested sea, can greatly reduce survival with additional weight attached and no life raft.

4. Automatically deployed survival kits are presently being used in some aircraft. American Safety Flight Systems (formerly Global Systems) and Koch are the two companies building automatic kits. American Safety was visited in March 1971 to obtain as much information as possible on the family of automatically deployed kits. The following are the results of that visit:

- a. Three (3) basic automatic systems are in existence; all have a manual override to stop the automatic features:
 - (1) Altitude manual setting (aneroid operated) usually between 15,000 feet and sea level.
 - (2) Time-delay activation 0 to 15 seconds.
 - (3) Delay-cartridge activation usually 4-second cartridge.
- b. Of the systems described above, there are two methods of activation:
 - (1) System where man leaves the ejection seat after bailout. This system is rigged to

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the chute and is activated after parachute deployment.

- (2) System where man rides seat down to preset parachute deployment altitude (like U-2R). When man leaves the seat, a cartridge time delay is activated, usually a 4-second delay.

- c. In existence now is a miniactivator without an aneroid or timer, just a cartridge which generates gas on a 4-second delay.

5. All of the automatic systems now in use deploy the kit above 10,000 feet MSL. The reason the Air Force can live with this is due to installation of a 4-line jettisoning lanyard on personnel parachutes which reduces oscillation as discussed in paragraph 2. U-2R personnel parachutes do not have this modification.

6. To incorporate the above automatic features, an engineering effort would be necessary in our program to the extent of combining an aneroid plus a 4-second cartridge to allow for presetting altitude to terrain being flown plus low-altitude bailout.

7. Information has been obtained by General Don Flickinger on a new Electronic Altitude Sensing Device. The Bonzer Ink Corporation, Overland Park, Kansas City, Kansas, makes the electronic sensing device; and Metric Systems, Ft. Walton Beach, Florida, makes the housing for the device and adapts the unit to systems requiring this type device. Metric Systems are the distributors for Bonzer Ink Corporation.

- a. This electronic sensing device was tested at Eglin AFB and presently is being used to activate parachute bombs. This device has an altitude setting above the terrain from 500 to 800 feet with accuracy of plus or minus 20 feet. The antenna to receive the ground signal is a 12" x 12" sheet of aluminum foil. The size of the sensing device is approximately 2-1/2" x 6" x 3.4".

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- b. The electronic sensing device can possibly be adapted to the U-2R survival kit at a very low cost. The device could be attached to the outside without taking up space inside the kit. The 12" x 12" sheet of aluminum foil for the antenna could be placed in the bottom of the kit and later used for survival.
 - c. Ideally, deployment of the survival kit should be accomplished at 1500 to 2000 feet above the terrain. If the present sensing device is adapted to the kit with maximum deployment altitude of 800 feet, it would be used for a back-up system only. However, the sensing device can be constructed to operate at any altitude, but increases in size as the altitude increases.
 - d. The beauty of the electronic sensing device is that the kit will be deployed at the altitude setting above the terrain regardless of elevation above sea level.
8. Recommend the following action be taken to obtain further information for the adaptability of the electronic sensing device to the U-2R survival kit:
- a. Visit the Bonzer Ink Corporation with the U-2R kit to discuss the possibilities of making the unit function 1500-2000 feet and still be constructed to adapt to the outside of the kit.
 - b. With information obtained from Bonzer Ink Corporation, visit Metric Systems to discuss attachment of the device to the kit, cost involved per kit, and if any test program would be involved.

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Attachment:
Endorsements

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Attachment to:
IDEA-2449/71

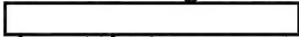
First Endorsement:

Recommend this action be taken as soon as possible. At a meeting held in Buffalo, New York, 19 October 1971 with the ARO Corporation, the prime contractor of the survival seat kit for both the U-2R and the SR-71, a new automatic kit was demonstrated. This device provides for kit deployment at 14,000 feet 4 seconds after main parachute deployment. The contractor indicated that this system was to his knowledge the most advanced state of the art. It would appear that the above memo clearly indicates this is not the case and investigation of this new device is in order.



Aero Medical Staff/OSA

Second Endorsement:

Strongly urge consideration be given this report and recommend approval of  visitation to two companies mentioned. Military airlift probably to be utilized.

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Chief, Aero Medical Staff/OSA

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How much \$ are we talking about?
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MEMORANDUM FOR: Gen Bevan

Re: Seat Kit Mod

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[] dropped ^{by} to advise that cost of mod is unknown. Ball park figure has been given - approx \$800.00 per mod. [] will determine these figures on the trip.

OK MB

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FORM NO. 101 REPLACES FORM 10-101
1 AUG 54 WHICH MAY BE USED.

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